



Naval Education and  
Training Command

NAVEDTRA 10543-E1  
April 1987  
0502-LP-052-7170

Training Manual (TRAMAN)  
and Nonresident Training  
Course (NRTC)

# Engineman 1 & C

## NOTICE

Page 6-2 must be printed  
on a  
**COLOR** printer.

Only one answer sheet is included in the NRTC. Reproduce the required number of sheets you need or get answer sheets from your ESO or designated officer.

**DISTRIBUTION STATEMENT A:** Approved for public release; distribution is unlimited.

The public may request copies of this document by following the purchasing instruction on the inside cover.



0502LP0527170

Although the words “he,” “him,” and “his” are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this material.

**DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.**

The public may request copies of this document by writing to Superintendent of Documents, Government Printing Office, Washington, DC 20402-0001 or to the Naval Inventory Control Point (NAVICP) - Cog "I" Material, Attention Cash Sales, 700 Robbins Avenue, Philadelphia PA 19111-5098.

NAVAL EDUCATION AND TRAINING PROGRAM  
MANAGEMENT SUPPORT ACTIVITY  
PENSACOLA, FLORIDA 32509-5000

ERRATA NO. 1  
Stock Ordering No.  
0502-LP-052-7171

12 March 1991

Specific Instructions and Errata  
for Nonresident Training Course and TRAMAN

ENGINEMAN 1 & C  
NAVEDTRA 10543-E1

1. TO OBTAIN CREDIT FOR DELETED QUESTIONS, SHOW THIS ERRATA TO YOUR LOCAL COURSE ADMINISTRATOR (ESO/SCORER). THE LOCAL COURSE ADMINISTRATOR (ESO/SCORER) IS DIRECTED TO CORRECT THE ANSWER KEY FOR THIS COURSE BY INDICATING THE QUESTIONS DELETED.

2. No attempt has been made to issue corrections for errors in typing, punctuation, and so on, which will not affect your ability to answer the question.

3. Assignment Booklet, NAVEDTRA 10543-E1

Delete the following questions and leave the answer key blank.

<u>Question</u>	<u>Question</u>	<u>Question</u>
3-69	7-53	9-22
7-32	8-46	
7-40	9-21	

Make the following changes:

<u>Question</u>	<u>Change</u>
2-23	In the question, line 2, change the words "ship to ship" to read "ship to shop"
3-35	In the question, line 4, delete the word "chief"
4-35	In choice 1, change the word "pressure" to read "presence" and delete the word "the" before "oil"
5-42	In choice 2, change the word "tapped" to read "tappet"



0502LP0527171

Assignment Booklet, NAVEDTRA 10543-E1 (Continued)

Question\_\_\_\_\_

Change\_\_\_\_\_

8-4

In the question, line 1,  
change the words "an air" to  
read "A"

In the instructions  
for answering questions  
5-55 through 9-58

Change figure numbers "9-4"  
and "9-5" to read "7-4" and  
"7-5"

4. Textbook, NAVEDTRA 10543-E1

Make the following changes:

Page\_\_\_\_\_

Col\_\_\_\_\_

Para\_\_\_\_\_

Change\_\_\_\_\_

2-4

Right

2

Change "feed" to  
"feet"

8-14

Right

1

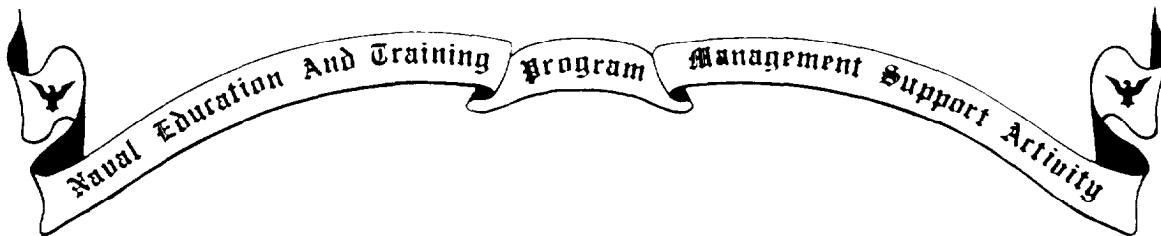
Change "chapter 63"  
to "chapter 631"

9-13

Left

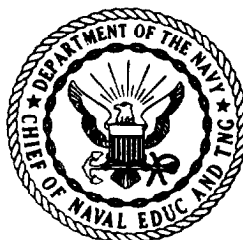
3

Delete repeat  
sentence starting  
from "a few  
lights... ending to  
switchboards"



# ENGINEMAN 1 & C

NAVEDTRA 10543-E1



*1983 Edition Prepared by  
ENC Kenneth L. Butts*





## **PREFACE**

This Rate Training Manual and Nonresident Career Course (RTM/NRCC) form a self-study package that provides information which relates to tasks required to meet shipboard needs—tasks that are performed by shipboard personnel serving as Engineman First Class and Chief Engineman. These tasks are essential to maintain the effectiveness and mobility of the ship. They include operation, repair, and maintenance of internal-combustion types of propulsion machinery and shipboard auxiliary equipment.

Designed for individual study and to support on-the-job training, this RTM provides subject matter that relates directly to the occupational qualifications of the Engineman rating. The NRCC provides the usual way of satisfying the requirements for completing the RTM. The set of assignments in the NRCC includes learning objectives and supporting items designed to lead students through the RTM.

This self-study package was prepared by the Naval Education and Training Program Development Center, Pensacola, Florida, for the Chief of Naval Education and Training. Technical assistance was provided by the Naval Service Schools Command, Norfolk and by the Naval Sea Systems Command. The information provided by numerous manufacturers, publishers, and associations is gratefully acknowledged.

Revised 1983  
Reprinted 1987

**Stock Ordering No.**  
**0502-LP-052-7170**

Published by  
NAVAL EDUCATION AND TRAINING PROGRAM  
MANAGEMENT SUPPORT ACTIVITY

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON, D.C.: 1983

# **THE UNITED STATES NAVY**

## **GUARDIAN OF OUR COUNTRY**

The United States Navy is responsible for maintaining control of the sea and is a ready force on watch at home and overseas, capable of strong action to preserve the peace or of instant offensive action to win in war.

It is upon the maintenance of this control that our country's glorious future depends; the United States Navy exists to make it so.

## **WE SERVE WITH HONOR**

Tradition, valor, and victory are the Navy's heritage from the past. To these may be added dedication, discipline, and vigilance as the watchwords of the present and the future.

At home or on distant stations we serve with pride, confident in the respect of our country, our shipmates, and our families.

Our responsibilities sober us; our adversities strengthen us.

Service to God and Country is our special privilege. We serve with honor.

## **THE FUTURE OF THE NAVY**

The Navy will always employ new weapons, new techniques, and greater power to protect and defend the United States on the sea, under the sea, and in the air.

Now and in the future, control of the sea gives the United States her greatest advantage for the maintenance of peace and for victory in war.

Mobility, surprise, dispersal, and offensive power are the keynotes of the new Navy. The roots of the Navy lie in a strong belief in the future, in continued dedication to our tasks, and in reflection on our heritage from the past.

Never have our opportunities and our responsibilities been greater.



# CONTENTS

CHAPTER	Page
1. Introduction .....	1-1
2. Administration, Supervision, and Training. ....	2-1
3. Engine Maintenance .....	3-1
4. Reduction Gears and Related Equipment .....	4-1
5. Engine Performance and Efficiency. ....	5-1
6. Refrigeration and Air Conditioning .....	6-1
7. Auxiliary Machinery .....	7-1
8. Environmental Pollution .....	8-1
9. Engineering Casualty Control .....	9-1
INDEX .....	I-1
Nonresident Career Course follows Index	

## CREDITS

The illustrations indicated below are included in this edition of *Engineman I & C* through the courtesy of the designated sources. Permission to use these illustrations is gratefully acknowledged. Permission to reproduce illustrations and other materials in this publication should be obtained from the source.

Sources:\_\_\_\_\_

Figures:\_\_\_\_\_

American Bosch Corporation

3-14

Bacharach Industrial Instrument  
Company

3-1, 3-2, 3-3

General Motors Corporation,  
Cleveland Diesel Engine Division

3-8

General Motors Corporation  
Detroit Diesel Allison Division

3-28, 3-29